

Title <b>Heat Engineering</b>	Code <b>1010101231010130343</b>
Field <b>Environmental Engineering First-cycle Studies</b>	Year / Semester <b>2 / 3</b>
Specialty -	Course <b>core</b>
Hours Lectures: <b>3</b> Classes: <b>2</b> Laboratory: <b>1</b> Projects / seminars: -	Number of credits <b>7</b>
	Language <b>polish</b>

**Lecturer:**

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**Status of the course in the study program:**

Heat Engineering and Heat Transfer

**Assumptions and objectives of the course:**

The main aim of the course is to present and discuss general principles and method used in heat engineering and heat transfer. Students should gain basic information on heat engineering and obtain an ability to use the theoretical knowledge in practice, especially in the field of energy balances of heat engineering devices and systems.

**Contents of the course (course description):**

Thermodynamics in heat engineering. Thermodynamic properties of a system and thermodynamic state. P-u-T behaviour of low (ideal) and moderate density gases. Pure gases and mixture of gases. Quantity of substance, standard conditions. Water vapour and gas-vapour mixtures, humid air ? psychrometrics. Application of psychrometrics. Methods of energy transfer, internal energy, enthalpy, work and heat. Energy of pipe fluid stream. 1st Low of Thermodynamics. Mass and energy balances. 2nd Low of Thermodynamics, entropy. Thermodynamic processes. Compressors. Thermodynamic cycles, thermal efficiency. Power, refrigeration and heat pump cycles. Exergy. Principles of heat transfer: conduction, convection, radiation and overall heat transfer. Heat exchangers. Heat pipes.

**Introductory courses and the required pre-knowledge:**

Fundamentals of mathematics, physics and chemistry

**Courses form and teaching methods:**

Lectures, tutorials, laboratory experiments illustrating selected topics of the course

**Form and terms of complete the course - requirements and assessment methods:**

Tests, solving problems: written and oral examination

**Basic Bibliography:**

1. KALINOWSKI E. Termodynamika Skrypt Pol. Wrocl. Wrocław 1994
2. SZARGUT J. Termodynamika techniczna (71 zł) Wyd. Polit. Śląskiej Gliwice 2005
3. OCHEŃDUSZKO St. Termodynamika stosowana. WNT Warszawa 1964

4. SMUSZ R., WILK J., WOLAŃCZYK F. Termodynamika. Repetytorium. Wyd. III, 10 zł Oficyna Wyd. Polit. Rzeszowskiej Rzeszów 2009
5. KOSTOWSKI E. Przewływ ciepła (49,50 zł) Wyd. Polit. Śląskiej Gliwice 2006
6. WIŚNIEWSKI St., WIŚNIEWSKI T.S. Wymiana ciepła WNT Warszawa 1997
7. Praca zb. (red. T.R. Fodemski), Pomiary cieplne, T. 1 i T. 2 WNT Warszawa 2001
8. OLEŚKOWICZ-POPIEL C., WOJTKOWIAK J. Eksperymenty w wymianie ciepła. Wyd. II Wyd. Polit. Poznańskiej Poznań 2007
9. SONNTAG R.E., BORGNACKE C., VAN WYLEN G.J. Fundamentals of Classical Thermodynamics, SI Version, 6th Edition John Wiley & Sons, Inc. U S A 2003
10. SONNTAG R.E., BORGNACKE C., Introduction to Engineering Thermodynamics, 2nd Edition John Wiley & Sons, Inc. U S A 2007

**Additional Bibliography:**